

Computability Assignment

Year 2013/14 - Number 1

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1 Question

Define a binary property $p(x, y)$ over natural numbers that satisfies both the requisites:

1. $\forall x \in \mathbb{N}. \exists y \in \mathbb{N}. p(x, y)$ and
2. *it is false that* $\forall y \in \mathbb{N}. \exists x \in \mathbb{N}. p(x, y)$

Provide a definition for p , and a proof for the above claims.

1.1 Answer

$p(x, y) := (x < y)$

1.1.1 Proof

$x < y$ satisfied both the requisites since for all x there is always possible to find a greater number but not for all y there is always to find a smaller number.

For example:

if $y=0$ and $x=0$ $x < y = 0 < 0$ that is false

if $x=0$ and $y=1$ $x < y = 0 < 1$ that is true

if $x=1$ and $y=2$ $x < y = 1 < 2$ that is true